THE MAGNAVOX COMPANY, et al.,

Plaintiff,

vs.

CHICAGO DYNAMIC INDUSTRIES and SEEBURG CORP.,

Defendants.

No. 74 C 1030
and
74 C 2510

BEFORE: The Honorable JOHN F. GRADY, Judge.

Wednesday, December 29, 1976

10:00 o'clock a.m.

PRESENT:

MR. ANDERSON
MR. WILLIAMS
MR. ALLEGRETTI
MR. BRIODY

appeared for The Magnavox Company;

MR. GOLDENBERG
MR. RIFKIN

appeared for the Seeburg defendants and World Wide Distributors.

ALSO PRESENT:

MR. GEORGE R. PETTIT
Magnavox

THE CLERK: No. 74 C 1030 and 74 C 2510, Magnavox v. Chicago Dynamic Industries; case on trial.

THE COURT: Good morning.

MR. ANDERSON: Good morning, your Honor.

THE COURT: Everyone ready?

MR. ANDERSON: Yes, your Honor.

Dr. Ribbens, please resume the stand.

WILLIAM BENNETT RIBBENS,

called as a witness by the plaintiff herein, having been previously duly sworn, resumed the stand and testified further under oath as follows:

DIRECT EXAMINATION (Resumed)

BY MR. ANDERSON:

Q Dr. Ribbens, at the end of the session yesterday afternoon you were describing Plaintiffs' Exhibit 89, which is a chart of Figures 12A and 12B of Reissue Patent, 28,507.

Will you summarize and complete your description of the disclosure of the -507 patent as it pertains to the ping pong -- or the game shown -- the simulated ping pong game shown in Exhibit 89?

A Yes. I think the essential features to be considered here are the three spot generators. Keep in mind there are two which are controlled by players by virtue

of pairs of knobs which are depicted in Fig. 12A. I think it's important also to realize that the device itself generates the vertical and horizontal synchronizing pulses which appear in the composite video signal which is sent to the television receiver; and also, the pulses which generate on the television receiver the symbols corresponding to the paddles and the game spot are generated in response to both the horizontal and vertical synchronizing pulses. I think we established that point.

And that these devices basically operate as time delay pulse generators, and it's the time delay which determines the position on the screen at which the spot will appear.

With respect to the paddle generators, spot 1 and spot 2, the time delay is determined by the potentiometers which are under player control by virtue of knobs 131 and 132. These establish electrical conditions which determine the time delay from the top of the picture and from the left edge of the picture at which this spot will appear.

The game spot is influenced by a pair of control signals which are generated internally in the electronics, and whose position is determined by the condition of the Flip-Flop circuit and the components

associated with it, and also by the knobs under player control numbered 127 and 128, these being mechanically coupled to a pair of potentiometers, No. 125 and 126. Those influence the control signals.

I think attention should also be directed to the coincidence detector, numbered 121. It has three inputs, one each from the three spot generators, and is of such a design that it can determine conicidence between either of the paddle generators and the ball generator.

Q Dr. Ribbens, exactly what is meant by the term coincidence in this context?

A The term coincidence implies that the pulses occur simultaneously.

We can actually identify electrically or determine electrically the simultaneity of the pulses generated by the paddle 1 generator and the paddle 3 generator.

The effect on the screen would be such as to display the simultaneous coincidence or the superposition, that is, or perhaps a better word would be the coincidence, between the symbol represented by circle numbered 113 and either of the diamond shaped symbols labeled A or B, numbered 123 or 124, and this is very analogous to the TV games which I believe were demonstrated in the court, showing that -- in fact, in those games, I believe, the paddle A and paddle B symbols are represented by vertical lines, which tend to simulate the profile of a paddle.

The circle is drawn to illustrate that symbol 113 represents a ball, which moves under the influence of these game controlled electronics, these control signals.

After coincidence, the flip-flop circuit is changed, discontinuously, and in our parlance this

tends to be referred to as a binary function, binary being two -- it has two states.

In one state, the voltage at 118 will be such as to cause the ball to move to the right, and in the other state of the flip-flop it will cause it to move to the left.

So depending on which player achieved coincidence with the ball, this voltage will have one sense or the other, causing the spot generator to cause the symbol to move to the right or the left.

Q Dr. Ribbens, are those voltages on points 118 continuously changing, or are they constant, or can they be both?

A Well, they can be both, or they can be either, rather, but in this particular sense they have a capacitor which tends to integrate out the rapid variations associated with the discontinuity of the flip-flop.

At any rate, they change such as to cause the voltage on the spot generator to reverse the direction of the symbol.

Q I think there is some indication in the patents that the circuits caused the ball to continuously move. Is that correct?

A Yes. They cause the ball to continuously move.

Q Is that continuous motion some function of the signal, out of the circuit?

A Yes, it is. Very definitely.

Q And in order to accomplish that, then, does the voltage coming out of point 118 -- is that a constant voltage or a changing voltage?

A It is a changing voltage.

Q Go on, Dr. Ribbens.

A In addition, the players have control over the vertical motion by virtue of knobs, as I mentioned earlier, 127 and 128. These influence the voltage at

point 119, such as to cause the ball motion to go up or down.

So, as an example, assume that Player A has successfully completed coincidence between this paddle and the ball. The flip-flop will be changed to a state which gives control over the voltage at 119 to Player A. It switches in such a way that by following the dashed line we will find that potentiometer numbered 125 will be in force, and the voltage coming from Potentiometer 125 will pass through the resistor to the left of the capacitor, that is, to the left of the point numbered 119 in Exhibit 89.

So after coincidence, the player can actually influence the motion of the ball and presumably attempt to make it more difficult for Player B to reach coincidence.

Q Dr. Ribbens, if, say, Player B sets his knob 128 as the ball is approaching his paddle and leaves it that way after the ball coincides with the paddle, what is the effect on the travel of the ball?

A Let me see if I understand the question. You mean if he doesn't change the knob after coincidence?

Q Yes. He makes an adjustment as the ball is approaching his paddle, but then does not change it afterwards.

A Then he would not be changing the motion of the ball beyond that point.

Q What would determine the angle at which the ball would come off the paddle in that event?

A The voltage at this point (indicating) at the time of coincidence.

Q What would determine that voltage at the time of coincidence if he sets the knob just before the paddle hits the knob?

A The setting of the knob.

Q The setting that he --

A The setting that he has achieved, correct.

Q Continue, if you will.

A I think the only other point that I would like to reiterate from yesterday is that the outputs of each of these spot generators is represented by the yellow lines which go from the spot generator to the block labeled "OR Gate and Pulse Shaper."

These combine the video signals which determine the brightness of the screen into a single signal, and then the block just to the right, labeled "Summer and R. F. Oscillator", combines the video signal -- these are the pulses that we represented earlier in the schematic waveform -- with the synchronizing pulses, to provide a composite video signal, including the voltages necessary to influence the brightness of the picture and also to synchronize the raster with this device.

So this device contains all of the information necessary to tell the television set when to cause the sweep and how bright to make the screen.

THE COURT: Let me go back for just a minute. Is it the Flip-Flop circuit that causes the ball to bounce off the paddle when there is coincidence?

THE WITNESS: Yes. The coincidence is detected at this point (indicating), and then the reversal of direction takes place by having this circuit flip-flop.

THE COURT: And that also controls the additional feature of allowing the player to impart English to the ball, is that correct?

THE WITNESS: That is correct.

THE COURT: Now, I take it they are two separate functions, the flip-flop and --

THE WITNESS: No. Really, in fact, I haven't gotten into that. I think that is a bit of a detail.

If you notice the two vertical lines coming from the Flip-Flop, actually all the Flip-Flop does is alternate the voltages on that pair of wires and because of the diodes, we can activate either one pair of resistors or the other pair.

One pair of resistors -- let's take the left motion, for example: If potentiometer 135 were in force, then the motion would be to the left, and the horizontal motion would be influenced by the

line labeled H_L.

Similarly, Player B would have influence over the ball.

So that I alternate between having the pair of potentiometers, 135 and 126, influence the ball motion, and the pair of potentiometers 134 and 125 influence the ball motion.

So all I really have to do is to just switch these two wires, switch the voltages on those two wires, and I have accomplished the fact. The diodes are devices --

THE COURT: To accomplish what?

THE WITNESS: I'm sorry. The reversal of direction and the exchange of control over the vertical motion from one player to the next.

THE COURT: Well, are you going to go further and talk about the English feature, or have you already covered that?

THE WITNESS: Well, I have covered it as much as I had planned to. All I was intending to say is that the players each have a knob and each player controls one of these two potentiometers.

But I would be happy to answer any questions.

THE COURT: No, I got the impression that that was an important part of the game. I gather you don't feel that it's a particularly intricate part of the game, relatively speaking?

THE WITNESS: No, nor is it fundamental to the teaching. It's an example. There are many ways in which the ball motion can be influenced after coincidence. I believe the patent teaches that there's a mechanism for detecting coincidence between a hit symbol and a hitting symbol, and then influencing the motion. This is one implementation of that concept, one example implementation.

BY MR. ANDERSON:

Q Perhaps you can explain, Dr. Ribbens, the action of the flip-flop, and perhaps the action of the english control knob 127 for Player A.

If, as the ball is approaching Player A's paddle, he, for example, rotates the knob 127 up, and then the ball hits his paddle, what happens if he doesn't change it after that, and, in contrast, if he leaves the knob 127 centered as he sees the ball approaching his paddle, what happens, and if he turns

the knob 127 down as the ball is approaching the paddle and leaves it that way, what happens? Maybe that will clear it up.

A If he leaves it centered, he would tend to produce a motion coming straight back. If he moves it up, after striking the paddle the ball would tend to move up. If he moves it to produce a downward motion, then after coincidence the ball would tend to move down.

So, he has a variety -- a continum, if you will, of choices depending on the position of the potentiometer.

Q If I understand the english control, in addition to those preset options he has to make the ball go straight up, straight out, straight down at an angle --

A He can also make it curve.

Q -- if he elects to adjust that knob 127 after the ball hits his paddle, then what happens?

A Then the motion will not be straight line, it will be a curve. He can actually make it start out and then come down like so (indicating).

Q Does the presence of that english, either preset or after hitting the player's paddle, have any influence on the play of the game, as far as you under-

stand the circumstances?

A I'm sorry. Say that again.

Q What is the influence on the play of the game that is produced by either presetting the english knob before the player hits the ball or adjusting it afterward? Just generally in the play of the game, what is the effect?

A Well, if he is adjusting it afterwards, then he is causing the motion to be under his control. If he leaves the -- if he doesn't touch either of those knobs, then the play will be determined by a set of fixed conditions.

Q That he had put in before the impact or hit?

A That's correct.

MR. ANDERSON: Are there any other questions the Court might have about english?

THE COURT: No.

THE WITNESS: Shall I go to the next exhibit?

BY MR. ANDERSON:

Q All right. Before you go to the next exhibit, Professor Ribbens, would you please look at the '507 patent itself?

A Oh, yes. It's up here.

Q I think, in the context of your -- perhaps if it's possible -- in the context of your chart, Exhibit

89, could you relate some of the other figures to that figure just by way of reference?

For example, could you relate the circuit diagrams that are in Figures 7 and 8, perhaps 9A and 9B, or whatever circuits would show what is in these blocks as taught by the patent?

A Yes.

Your Honor, if you will refer to Figure 8 and Figure 7 of '507 --

THE COURT: All right.

BY THE WITNESS:

A -- in Figure 8 there is -- this is a schematic diagram of a circuit which is capable of generating any of the spots, spot 1, spot 2, or spot 3.

The arrow-directed lines at the top correspond to an input voltage from the horizontal sync sawtooth, and it's labeled "Horizontal sync sawtooth."

There's another input just below that which is labeled e_{HI}. That corresponds to one of the -- either the horizontal or the vertical -- in fact, in this case, it's referring to the horizontal control input, which would be the line leading from point 118 -- let's see if I have got that right -- from point 118 to block 114, if this were to be used to generate a ball, for example.

Similarly, it corresponds to the link between potentiometer 129 and block 125. So that's the point at which, on this circuit, the control voltage enters.

We have two inputs to each of the blocks -- well, in fact, there are four inputs. The horizontal and vertical synchronizing pulses and then horizontal and vertical control, and in this particular game we are not changing the horizontal position, so that's an option --

BY MR. ANDERSON:

Q The game of Figures 12A and 12B?

A Excuse me, yes, the game of Figure 12A is an example in which the horizontal position of the paddle spots are not changed. So, we have a fixed voltage e_{HI} in Figure 8 for the block which is labeled 125.

And the output is -- at the extreme

right, you will find a line with an arrow labeled "Video Signal to and R.F. Oscillator" -- well, before that we come to the point labeled "Spot 1 Video." I think that's a more important point to identify for the moment. That would be the point at which the pulse appears, which characterizes the symbol which we are attempting to display, either the paddle or the ball.

Q And would that represent one of the colored lines on Plaintiffs' Exhibit 89?

A Yes, that would represent one of the yellow lines coming from each of the spots.

So, actually, what I am saying, your Honor, is that each one of these blocks would contain a circuit such as is drawn in Figure 8, and then we would take the output, for instance, Spot 1 Video, and connect that to the OR Gate and Pulse Shaper block of Exhibit 89.

Q All right, would you similarly just relate the detailed circuit of Figure 7 to the block diagram in that same functional sense?

A Yes. Figure 7 would correspond to either the vertical sync sawtooth generator numbered 115 or the horizontal sync generator numbered 116, and if you will refer to Figure 7, you will see that at the left there is a line coming out with a circle on it, and a waveform drawn below it. That corresponds to the generation of the synchronizing pulse, and that synchronizing pulse would be connected as shown from the output of the vertical sync sawtooth generator with a solid blue line connecting that block with the block labeled "Summer and RF Oscillator" on Figure 12A of Exhibit 89.

Q All right, and there's a second output?

A The sawtooth output at the right, the line extending to the right with a circle, would correspond to the line going from block 115 along to each of the spot generators, and would provide the input which is shown in Figure 8 with the little line with an arrow at the top where it says "Horizontal sync sawtooth generator." That would be connected to the horizontal sawtooth generator.

There is a similar line with a small

arrow drawn on it labeled "Vertical sync sawtooth generator" in Figure 8, so from the vertical sync sawtooth generator, there would be a connection to each of the spot generators.

Q All right. Thank you. Now, if -- excuse me --

A I'm not sure I made that very clear.

THE COURT: I think it's as clear as it's going to get.

THE WITNESS: Okay, thank you.

THE COURT: And I mean by that that I obviously cannot understand these diagrams in the same way that you understand them, but I think to the extent of my capacity I follow you.

THE WITNESS: No, all I was intending to do, your Honor, was to show that we have drawn a number of lines on here with arrows going into the block, and these really represent physically connections to an electric circuit as taught by '507, and that the corresponding inputs are so labeled in Figure 7 and Figure 8.

BY MR. ANDERSON:

Q Thank you. Yesterday afternoon, Dr. Ribbens, you briefly referred to Figures 18 and 19 of the Reissue Patent Re. 28,507, as relating to alternate setups for the games taught in the '507 patent.

Will you describe briefly the differences taught between the circuit of 12A, Exhibit 89, and Figures 18 and 19?

A Yes. For example, in Figure 18A --

Q And that's at sheet 14?

A Yes.

Q Of the patent?

A Yes.

Have you found that, your Honor?

THE COURT: Yes.

BY THE WITNESS:

A You will note we have blocks in Figure 18A which are similar to the blocks in Figure 12A of Exhibit 89, and particularly we have vertical and horizontal sync sawtooth generators labeled, once again, 115 and 116.

Below that there are a number of spot generators labeled 191 and 192. 191 is identified as spot 1 generator. That's analagous to one of the paddle generators, or the ball generator. 192 is labeled spot n generator, and "n" typically stands for an integer, so we are indicating that there is an undefined number of such spot generators, that there's no restriction to either one or two or three. We can have n such spot generators. They are connected as shown by the arrow going from the dashed line to block

193 to an OR gate and Pulse Shaper such as shown in Figure 12A, Exhibit 89.

Finally, the output from 193 is indicated by a line with an arrow which goes to a block numbered 194 called the Summer. You will note that that block also has two other inputs indicated by the lines with the arrows drawn at the bottom. Those come from the vertical sync sawtooth generator and would actually be the synchronizing pulse output from those generators.

The summer provides the composite signal, including both horizontal and vertical synchronizing pulses, and the video information for all n such spots, and is connected to a larger block called "Conventional Television Receiver" at point 203.

There's a switch drawn. 201 is to be interpreted as an electric switch, which indicates that this Conventional television receiver can either be used to receive broadcast stations with a switch in the position at 202 --

BY MR. ANDERSON:

Q That's as it's actually shown in the drawing?

A Yes, the line connecting point 201 to 202 indicates that the switch is thrown such as to receive broadcast television stations from the antenna or from perhaps a cable input in CATV.

The alternate choice is to rotate the switch so that the line, instead of being drawn to point 202, would be drawn to point 203, and that would indicate that the switch is thrown, and that the composite video signal from the summer is connected to the video amplifier, and from that point on the television receiver operates the way in which we described earlier. It separates out the synchronizing signals, generates the horizontal and vertical sweep, and also activates the electron gun in such a way as to vary the intensity of the displayed spots.

BY MR. ANDERSON:

Q If you will, refer to your chart that's on the

easel, Plaintiffs' Exhibit No. 86, and relate that, if you can, to Figure 18A of the Reissue Patent 28,507.

A The signal coming from the summer block would enter the television receiver at this point to the left of the video amplifier.

Q That's the point you have marked "Video Signal"?

A "Video Signal", right.

Q And then is there correspondence between the video detector shown in the -507 patent and the white block labeled "Video Detector" on your chart, Exhibit 86?

A Yes. You will note that the block No. 190 in Figure 18A, identified as a "Conventional Television Receiver," is actually incomplete. They are only indicating the two critical components in the circuit between which the connection is made, the implication being that the part beyond the point labeled "Video Signal" will be the same as is shown in Exhibit 86, namely, it will include video amplifier, and then the synchronizing and deflection apparatus.

Q Which are the colored blocks in Exhibit 86?

A Correct. And the video detector is shown to the left of that point in Exhibit 86.

I think the figure indicates just schematically a way in which a signal such as this, as

taught by Patent -507, Figure 18A, could be used with a conventional television receiver, and by providing a switch, the television receiver could either operate so as to display the game or to receive broadcast television stations.

Q When the television receiver is hooked to the game in Fig. 18A, by throwing the switch 201 to the down position, what function, if any, is being performed by the video detector in the play of the game?

A In the play of the game the video detector is not utilized.

Q Is that also true in Exhibit 86 of the intermediate frequency amplifier and the radio frequency tuner?

A The way we have shown it in Exhibit 86 is with the signals, the possibility of the signals coming through.

I think to utilize the television receiver to display a video game, it would be necessary to disable this point (indicating) so signals from the television station can't appear and cause an interference. That is the point of the switch.

Q Dr. Ribbens, will you then describe the disclosure of Patent 28,598, using whatever charts or aids you might have to assist the Court?

A I will use Exhibit 90.

Exhibit 90 is a reproduction of a figure which appears in Patent Reissue 28,598.

The figure happens to be the same as in

our previous chart, Figs. 12A and 12B and I intended to give as an example a game in which there is a fixed visible barrier from which the game spot ball can bounce.

If you will direct your attention to Fig. 12B, you will see that I have a vertical dark line drawn, which is numbered 121. There is a clear rectangle numbered 100 and a pair of rectangles with the letters A and B inscribed.

A and B correspond to Dot 1 and Dot 2 generators. These, for example, could be the same generators as used, or as taught, by the '507 patent, but as represented in the disclosure of '598 there is a different implementation of the time delay pulse generator.

Q When you say implementation --

A The circuitry.

Q The circuitry inside of the boxes or the blocks in Fig. 12A?

A I meant to imply the circuitry inside of the blocks as taught by '598 is different from that taught by '507. But conceptually they provide somewhat the same function, in that the information is derived first from the synchronizing pulse, and by virtue of player controls, as indicated by the knobs 115 and 116, the player has control over the time delay of the pulse

generated by these blocks and therefore has control over the vertical position on the display picture on the television receiver.

Also indicated in this figure, as I pointed out earlier, is a block, rectangle 100. That would be produced by Dot 3 generator 101 in Fig. 12A of this exhibit.

Another feature of this Exhibit 90, which I would like to call your attention, is the block labeled "Wall Generator". It is a symbol generator which produces the line which is drawn as a black vertical line numbered 121 in Fig. 12B.

Now, the difference is this game is intended to simulate a game similar to handball, in which the players attempt to reach coincidence with the ball. The ball will move back and forth and will have some vertical motion as well.

Upon reaching coincidence with the wall 121, the direction of the ball will reverse and move back to the right. The last player to have reached coincidence with that ball will have influence over its vertical motion by virtue of knobs 111 or 112 in Fig. 12A. The other player will attempt to move his symbol to reach coincidence with his ball by varying the vertical position of his symbol generator through

either knobs 115 or 116, depending on which player is active, which one is up, which one is the one obliged to hit the ball as in a handball game.

Of course, to be able to cause the ball to reverse we need to be able to detect coincidence between the wall generator and the ball.

Similarly, to be able to influence the motion of the ball after coincidence with a paddle, it is necessary to be able to detect coincidence between the paddle geneator and the ball.

I think I might just continue with a functional description of a game as viewed by the observer before discussing the mechanism for reversing the motion.

I think the point at which I left that discussion was that the ball would be moving back to the right after bouncing from the wall. Assume for the moment that Player B was the last to reach coincidence. He is able to influence the vertical motion of the ball. Player A will adjust the knob 115 of Fig. 12A to attempt to reach coincidence. If he is successful, the direction of the ball will reverse and it will come back toward the wall.

At that point he will have control -- excuse me. The control over the vertical motion will be transferred to Player A.

So this is somewhat similar in concept to the change of control over the vertical motion as

described with respect to Exhibit 89. That is the English control. Except that the implementation is somewhat different, as illustrated in Exhibit 90.

Here it is necessary to have two Flip-Flops, because there are two separate conditions which have to be identified. That is, after coincidence with the wall it is intended in this game to have control over the vertical motion of the ball retained by the last player who hit it.

For example, Player B, if he were the last to hit the ball, would be able to influence its vertical motion.

It is necessary to detect coincidence with the wall to change the horizontal motion of the ball, but not to change control over its vertical motion from Player B to Player A. That will only be accomplished if Player A is successful in causing coincidence.

THE COURT: One Flip-Flop for the paddle and one Flip-Flop for the wall, is that it?

THE WITNESS: Actually, one Flip-Flop controls horizontal motion and another Flip-Flop, the so-called primary Flip-Flop 104, influences which player had English control or vertical motion control.

BY MR. ANDERSON:

Q So that the secondary flip-flop controls reversal of the motion?

A That's correct.

Q Both when the wall is hit by the ball --

A And when the paddle is hit. So we need to detect coincidence from all four symbols.

Q You are indicating how that coincidence is detected by all four symbols.

A I was about to. The block labeled "Coincidence Circuit" 125 in Fig. 12A has connections from all four dot generators, as indicated by the yellow lines.

So whenever coincidence is achieved between either the ball and the paddles or the wall, the coincidence detector will generate a signal. Depending on whether that coincidence was with only the wall, in which case the detector is to change the direction of the motion, then --

Q You mean the horizontal direction?

A Excuse me. Let me start again.

If the ball has reached coincidence with the wall 121, then that would activate the lead 128 connecting the coincidence circuit with the secondary flip-flop 122.

That would produce a control voltage

which goes to the ball's horizontal input control and will cause reversal of direction.

That would not influence the primary flip-flop and change control of the english from one player to the next. However, if the coincidence occurred between ball 100 and paddle A, then an output would be provided on lead 126 -- well, just a moment. Either 126 or 127, and 128, because it is necessary to reverse the horizontal motion without coincidence with the wall or the paddle.

So in any event, the lead which connects the secondary flip-flop with the Dot 3 generator will change for each coincidence. However, either 126 or 127 will be activated when the ball hits one of the paddles and effect the primary flip-flop to transfer english control -- this is the vertical, the lead labeled e_{V_3} to the Dot 3 generator controls the vertical motion of the ball.

THE COURT: Why were two flip-flops unnecessary in '507?

THE WITNESS: Because each time a player reached coincidence, the ball reversed direction and control of the english was reversed.

But in this particular example, we only want to change control of the english when a

player hits the ball. But every time there is a coincidence, we want to reverse direction. It is because both players are on the same side, your Honor. So in one case we only want to detect coincidence with the wall and change the horizontal direction, and in the previous example the only coincidence possible was with a paddle.

THE COURT: Really what you are saying is a separate flip-flop simply to provide a reverse bounce off the wall, is that true?

THE WITNESS: Well, I think this could be properly viewed as a change direction command.

THE COURT: Off the wall only.

THE WITNESS: Off either. Each time there is a coincidence, we want to reverse direction. Regardless of whether it is a wall or the ball.

However, we want to detect particularly coincidence between the ball and the paddle for english control, and to do so with a primary flip-flop.

BY MR. ANDERSON:

Q Dr. Ribbens, is the total apparent motion of the ball in some way related to both the vertical motion and the horizontal motion that you have been talking about in some combination?

A Yes.

Q Could you just basically explain that concept? Maybe that will clarify the function of the two flip-flops.

A Well, the horizontal motion is influenced by the control voltage on the Dot 3 generator input labeled e_{H_3}.

Q That is just a component of motion from left to right?

A That is the horizontal component of motion. That is independent of the vertical motion. We can independently control the vertical motion by virtue of the english controls.

There are a pair of potentiometers in this case, as there were in the previous example, numbered 109 and 110. These are mechanically linked to knobs 112 and 111. So that we either connect a voltage to 110 -- if we did so, Player B would have control over the vertical motion -- or we connect the voltage to 109 -- and then Player A would have control of the vertical motion.

So the horizontal motion is determined automatically by the position of the secondary flip-flop. The vertical motion is controlled by the potentiometer, which is in force at the time.

That is either Player A's potentiometer or Player B's potentiometer.

Q Can you explain how this vertical component and the horizontal component of motion combine to give some impact on the screen, some visual presentation? I am not sure yet that that is clear.

Whatever is appropriate, the vector relationship.

A Yes. That is true. Velocity and motion are described by vector relations and are a combination of or can be represented by orthogonal components, right-angle components. So we can always resolve any motion into components along two orthogonal directions.

Q And "orthogonal" means right-angles?

A Orthogonal means right-angles.

In this particular case it is convenient to consider horizontal motion as one component and vertical motion as the other component, and the two combined to give our resultant motion, which moves in some arbitrary manner -- not arbitrary -- in a manner as influenced by the setting of the controls.

Q I think, if it is possible, you might actually explain the step-by-step action on the screen, assuming that there is a hit of the ball by Player A followed by a hit of the ball by Player B, and in each case Player A sets his English knob before he hits the ball and then

leaves it that way for simplicity, and Player B pre-sets his knob for English control before he hits the ball and leaves it that way.

Say Player B turns it up and Player A turns it down, or something. Explain the whole sequence back and forth through two hits to the wall and to the player.

Perhaps that will clear up the matter.

A That is a good idea.

Let's assume the ball is moving toward Player A, and he is able to reach coincidence. It will move with uniform horizontal velocity. It will move with a uniform vertical velocity, as influenced by the setting of the knob under control of Player B.

He has already pre-set his vertical motions, and he has reached coincidence, so that sets the vertical motion for the ball. It may be moving up. It may be moving down. It may be moving directly horizontally.

Let's assume for the moment that he seeks to produce a slight downward motion. The ball will be moving downward, but with a uniform horizontal velocity. It will reach coincidence with the wall and will continue moving with the same vertical downward motion.

Q That means the angle that it hits the wall is equal and opposite the angle downward it comes off?

A Yes. And the ball will come off and reach coincidence with Player A. Immediately after coincidence, vertical motion of Player A -- excuse me. The vertical motion of the ball is determined by the setting of knob 111 under control of Player A.

Let's assume for the sake of argument that Player A will introduce a voltage which causes an upward motion. After coincidence the ball will continue to move with a uniform upward velocity and a uniform horizontal velocity until it reaches the wall, at which time its horizontal component will be reversed, but it's vertical component will stay the same.

This is equivalent to the ball moving up and essentially experiencing an elastic collision, in which the angle of incidence is equal to the angle of reflection.

But the direction will change upon coincidence with either of the two paddles, depending on how the knobs are set.

Q I think that is very helpful.

Now, if you can, relate those actions to the flipping of the primary and secondary Flip-Flops, just so that the circuit is related to the functional description you have just given of the play of the game.

A I am not sure I understand what you want, but --

Q When each impact occurs, which Flip-Flop influences the next trajectory of the ball.

A All right. I see.

Let's assume Player B was the last to reach coincidence. That means that the potentiometer 110 is active, which means that the primary Flip-Flop is connected such that there is a voltage across 110. You will find a point labeled c and a point labeled b on Potentiometer 110. Those correspond to the points c and b of the primary Flip-Flop. So there is actually an electrical connection between those two.

So the voltage would appear across b and c of the primary Flip-Flop.

Now, I have lost track of where I was going.

Q You now have said the Player B english knob 122 has been preset so that it put the voltage on the resistor 110, and I think you were then going to explain what happened.

A Yes.

Then the ball will move with the uniform velocity, assuming knob 112 is not changed. It will move with a uniform vertical velocity, assuming with respect to Fig. 12B that it is downward.

The ball also will be moving to the right, as determined --

Q To the left.

A Excuse me. To the left. Determined by the output of the secondary flip-flop, the lead going from the secondary flip-flop to the input of the Dot 3 generator, e_{H_3}.

The ball will continue to move until it reaches coincidence with the wall. Coincidence will be determined in the coincidence circuit 125.

The only change will be that the lead 128 will activate the secondary flip-flop and cause the horizontal motion to reverse. But potentiometer 110 will still be effective for determining the vertical motion.

The ball will move now to the right --

Q So only the secondary flip-flop 122 performs a function as the ball now has hit the wall in your description?

A That is correct.

Now, the ball moves back. Player A reaches coincidence.

In this particular case both the primary and secondary flip-flops are activated. The horizontal direction will be reversed, because lead 128 will change the secondary flip-flop, causing the voltage at e_{H_3} to be reversed, that is, to cause the ball to go in the other direction.

At the same time, the primary flip-flop will be switched so that potentiometer 109 is corrected. Potentiometer 109 is connected from points a and d on 109 to points a and d on the primary flip-flop 104.

So this potentiometer, which is connected across points a and d,will be in force, and the preset, that is, the position of the potentiometer as set by knob 111, will cause the ball to move with a specific vertical component -- just as an example, since Fig. 12B is such, imagine that that is an upward component. So we have reversed the direction by virtue of the secondary flip-flop, and we have changed the vertical

motion by virtue of the primary flip-flop. So both flip-flops are active when the ball strikes the paddle. Only the secondary flip-flop is active when it strikes the wall.

Now, I will continue.

The vertical motion will be uniform, assuming this knob 111 is not changed. The ball horizontal motion will be uniform until it strikes the wall. At that instant, the coincidence circuit will activate lead 128, change the secondary flip-flop, reversing the direction of the ball, but the vertical component won't change because the primary flip-flop will not be activated.

So the ball will continue to move with a vertical component, having experienced with the wall what I would like to call an elastic collision, in which the angle of incidence is equal to the angle of reflection, and will move back to the right.

Q Does that complete your explanation of Plaintiffs' Exhibit 90?

A Yes. With the possible exception that there is one aspect that I have not really discussed, and that is when the ball is missed by a player, it goes off the screen to the right, or it can go off the screen to the top or bottom and disappear. It is necessary to start the game again, and in this particular example it has been chosen to start the game by a pair of switches 11 and 13, and these activate the primary Flip-Flop, and the secondary Flip-Flop, to essentially act as a serve, or re-set.

So either player can push the button and have control, and presumably the winning player, in one example game, would push the re-set and have control for the next serve.

Q Does the disclosure of the Reissue Patent 28,598, actually include a description of specific circuit details that go into each of the blocks shown in your Exhibit 90?

A Yes, it does.

Q Without going into any detail, would you just point out in general where that is shown in the figures or the description?

A Yes. I don't know what sheet number, but my sheet 4, Fig. 6, 7A -- well, 7B gives the waveforms.

7A gives the schematic of the circuit.

Have you found that, your Honor?

THE COURT: What exhibit are we on?

THE WITNESS: I'm sorry. This is Patent No. Reissue 28,598.

THE COURT: I was thinking of something else for a moment.

What is the relationship between the Flip-Flop type of mechanism and the horizontal and vertical sync generators?

THE WITNESS: Well, the Flip-Flop is a retriggerable monostable. That is, when it receives an electrical command, it changes state. The horizontal synchronizing generator continues to operate periodically automatically.

THE COURT: But they do essentially the same thing, in that they both move the spots horizontally and vertically?

THE WITNESS: Well, I would tend to think of the horizontal and vertical synchronizing pulses as being starting points for measuring the position of the spot, whereas the Flip-Flop determines which circuit has control of the motion.

So the primary and secondary Flip-Flops tend to influence the control voltage input of the spot

generator. The vertical and horizontal synchronizing generators essentially determine the starting point from which time will be measured to determine the position of the spot.

So this is the starting point of the time, and, if you will, the control voltage basically determines the stopping point or the point at which the pulse will be generated.

BY MR.ANDERSON:

Q Dr. Ribbens, is the Flip-Flop type circuit the only way that the sensing of coincidence in a conicidence circuit such as 125 in Exhibit 90 could be implemented as a change in motion on the screen, or are there other ways?

A No. That is just an example.

Q And then functionally, I think, once again, see if you can relate the concept of coincidence to the horizontal and vertical sync pulses and the action of the circuit in changing travel direction of the ball at the time of coincidence.

A Well, the coincidence circuit changes the primary and secondary Flip-Flop or adjusts the secondary Flip-Flop, depending on which coincidence took place and changes the control voltage.

Q And that control voltage is really the result of sensing coincidence, irrespective of what is used to implement it?

A Yes. I didn't understand your question. Yes.

Q And then coincidence is determined in a true time sense in this case?

A This is the simultaneity of the occurrence, this ball generator or either paddle generator or wall generator.

Q If the circuit is functioning properly at that time, there also will be an overlying of the ball and the paddle?

A Yes. They will appear to coincided geometrically.

Q Then the horizontal and vertical sync signals are really just a reference on which all these time relatinnships are built, is that about right?

A That is correct.

THE COURT: I think I had the cart before the horse.

THE WITNESS: I am sorry? I think it is helpful to think of these being kind of starting points, and maybe the blocks really, measuring a time delay from the synchronizing pulse before they generate a pulse, and in the meantime the television beam -- excuse me: The beam on the television picture tube is being swept, so that time delay determines a distance.

So, of course, the greater the time delay between the synchronizing pulses and the equivalent time position of the horizontal input, the farther along the picture tube the symbol will be displayed.

So if there were a very short time delay between the synchronizing pulse and the output of the Dot 3 generator, that would correspond to a symbol being at the left. If I started the horizontal synchronizing pulse and there were a long delay to the pulse generator, the output

of this, say the ball generator, -- pardon me. If there were a long time delay, then the spot would be at the extreme right.

So the control input just determines how long this block waits, how long the symbol generator waits, before it generates a pulse after the synchronizing pulse.

THE COURT: Would you read that back, please?

(Whereupon the record was read by the reporter as requested.)

BY THE WITNESS:

A Remember, the pulse output from this device displays a symbol. If there is no pulse output, we don't display a symbol, and the screen is black. If there is a pulse output, it displays a small spot, depending upon the duration of the pulse. The longer I wait for the horizontal synchronizing pulse, the farther to the right that symbol will be displayed.

So if I can control the voltage at the input to the symbol generators, I can effectively control the time delay from the synchronizing pulse to the time of occurrence of the symbol pulse.

THE COURT: It just seems to me that these two things should be tied in together in some way that they will work in cooperation.

BY MR. ANDERSON:

Q What is the thing that ties them in together, Dr. Ribbens?

A Oh, well, they are combined finally -- you are absolutely right -- they cannot function independently, and the television receiver has to have both of them.

THE COURT: All right, I had forgotten that.

BY MR. ANDERSON:

Q Now, you have pointed to the summer, and will you point out again how the vertical and horizontal sync information is ultimately tied in in these circuits taught in the '598 patent to coordinate the timing of these pulses and give you the spot where you want it?

A Well, as represented by Figure 12A, the four symbol generator pulse outputs are tied together with a block called an OR Gate. These are connected -- they are combined and they are connected to the summer and RF oscillator block.

Q Perhaps just deal with one of those, for simplicity.

A The summer, for example.

Q Well, just one of the four blocks.

A Oh, all right, let's consider the spot 1 generator will produce an output which passes to the OR Gate and eventually to this summer circuit.

Similarly, the two outputs from the horizontal and vertical synchronizing pulses come to the summer block.

I think it would have been easier to understand perhaps if this had been divided into two separate blocks because the summer and RF oscillator are two distinct operations. We add the signals -- that is, functionally they are separate --

THE COURT: I understand now. I had forgotten that we were not dealing with the end of the line here, but rather with the beginning of it, when we were talking about the controls.

BY MR. ANDERSON:

Q Perhaps in this context, now that you have gone through the '507 and the '598 patents and explained how balls and players are generated and moved around, could you now go back to Plaintiff's Exhibit 79, this simple little man, and explain how, on the screen, the timing of pulses might cause him to actually move, or move his arm, or something of that sort, or move

his head?

A It might be easier to talk about moving his head, because that's more analogous to the spots we have been viewing. Suppose we wanted to move his head back and forth. We would change the time delay from the synchronizing pulse to time of occurrence of the pulse which generates the head, and if we could cause that time delay to move -- to increase and decrease cyclically, we could effectively cause his head to shift back and forth or, similarly, motion of the arm up and down is a bit more complicated, because we have to simultaneously change the vertical and the horizontal time delay, so I think it's easier to illustrate the idea by thinking of just simply horizontal motion. If I wanted to make his head move up and down, then I would change the time delay from the vertical synchronizing pulse to the time of occurrence of the -- that is the number of lines which pass before his head is to be displayed.

BY MR. ANDERSON:

Q Now, just with respect to locating his head horizontally, is it correct that the portion of the line that includes his head, the second line in Exhibit 79, the portion of that line that is white from the left edge to the beginning of his head, would be the time

delay from the horizontal sync pulse to the pulse that makes his head appear on the screen?

A That's certainly true.

Q And then if that time delay were increased slightly --

A His head would move to the right.

Q So that by making that white portion longer, if I can show it, his head would move to the right?

A That's correct. If we made it shorter -- I think that might have been misleading because of the position of the synchronizing pulses. But keep in mind we are not changing the synchronizing pulses. It's just to illustrate the effect. I have shifted the strip, the second strip, to the right and to the left. But the synchronizing pulse would occur at the same point.

Q And in the circuits of the '507 and '598 patents, those movements of the balls and paddles are produced by these time delays from horizontal and vertical synchronization signals?

A That's correct, and those, in turn, are determined by the control voltage, and each of the inputs labeled e_{H_1}, e_{H_2}, e_{H_3}, or e_{WH}.

Q Thinking of some analogy, if you were measuring the distance, for example, to the -- well, perhaps in this Exhibit 90, if you were measuring the distance from the horizontal sync at the left side to the position of the Player B, and you thought of that, and now you have explained that time, but it also could be a ruler on the screen, and then the ruler has a zero end, and then an end where you say, say, five inches over, the B spot would appear, would there be any relationship between the zero end of the ruler by which you locate the B spot and the horizontal sync pulse?

A Oh, yes, the horizontal sync pulse would correspond to zero.

Q And so you are measuring --

A And the time of occurrence would -- of the spot B generator would correspond to the time of occurrence of that spot.

Q And the same -- if you were trying to locate the spot downwardly, the zero end of the ruler would be the vertical?

A Vertical synchronizing pulse.

Q And based on time, you would know how far down the B spot would occur?

A Yes. The distance along that scale would be

proportional to the number of lines from the top of the picture to the line in which the picture -- the symbol begins to be displayed.

MR. ANDERSON: Your Honor, I think that completes our explaination of the -507 and -598 patents.

I think we would be very pleased to go into any aspect where we might add clarity to the presentation that has been given.

THE COURT: No, I think I understand it as well as I ever will, unless I were to enroll in a course in electronics, which, obviously, is not feasible.

MR. ANDERSON: Your Honor, at this point we will go into the issue of the accused products and how they operate and how the patents relate to them.

We do have certain agreed facts with respect to the accused products. Those agreed facts begin in the Statement of Agreed Facts at Paragraph 18.

Paragraph 18, by agreement, lists the accused games of the defendant Chicago Dynamic Industries, and it is stipulated that the defendant CDI, or Chicago Dynamic Industries, since the issuance of the -284 and -285 patents, which, of course, became, respectively, the -507 and -598 Reissues, since the issuance of those two patents, the defendant CDI has

manufactured and sold each of the following coin-operated video games, and the games are then listed, TV Ping Pong, Model 424 --

THE COURT: What number are you on, Mr. Anderson?

MR. ANDERSON: Paragarph 18 of the stipulated or agreed statement of facts.

THE COURT: All right, I have that.

MR. ANDERSON: At this time, then, we would hand up to the Court the exhibits which relate to those specific games of CDI, or Chicago Dynamic Industries, and in paragraph 19 of the stipulated facts the defendant -- excuse me -- the coin-operated video games made and sold by CDI are, by agreement, accurately described in Plaintiffs Exhibits as listed in paragraph 19.

Thus, there is no dispute between the parties as to the disclosures of the circuit diagrams and the brochures relating to each of the seven games which, by stipulation, are accused games that have been made and sold by the defendant CDI.

THE COURT: Mr. Anderson, is Dr. Ribbens going to give his opinion as to what constitutes the invention in -507 and -598?

MR. ANDERSON: Your Honor, I had not planned to

have Dr. Ribbens give that opinion, but I certainly am not adverse to --

THE COURT: You see, I am attempting to focus in on what will be dispositive of the case, and I'm sure I can sit here and listen to great detail as to how the CDI games compare with Odyssey and with the -507 and -598 patents, but 99 out of a hundred of those coincidences may be on matters that are not patentable.

What I would like to find out -- and I have heard it from Mr. Baer, but I don't think in the detail that I would like to -- is what is the invention here, and then where, in the accused devices, does that invention appear.

MR. ANDERSON: Your Honor --

THE COURT: And I really don't want to go through each one of these devices with each circuit and each piece of electronic equipment which may be 75 years old in conception.

Do you follow what I am saying?

MR. ANDERSON: Yes, your Honor, and let me describe to the Court first that the two points that you raise are the two points that we intended to present. I think we had intended to present them

in the reverse order, give some general description of the games -- accused games in as general a sense as possible, and then take individual phrases from the claims -- of course, the claims of the patent define the invention -- and if the claim of the patent reads, describes, adequately or appropriately, or fairly, the accused product, then we have made out our case for infringement of the invention. The invention should be set forth in the claims.

THE COURT: Well, of course, I am addressing, myself, I suppose, to validity as well as infringement, here. Before we know whether we have infringement, we have to know whether we have validity, and I would really like to concentrate on the things that make these patents valid, and then I will look and see if I find those in the accused device. Otherwise, I am going to get lost in this morass of electronic information.

MR. ANDERSON: Your Honor, I think that's perfectly and completely appropriate --

THE COURT: I don't mean to tell you to do it that way if you have it programmed differently. I do suggest to you I will understand your case better if you do it that way.

MR. ANDERSON: We are completely willing and prepared to approach it from that point of view. I think perhaps -- I should at least point out, but not by way of trying to equivocate at all in what you have asked for, because we are prepared to do it -- of course, the burden of proving invalidity is upon the defendant.

THE COURT: I understand that.

MR. ANDERSON: The presumption of validity is in our favor, but certainly we are prepared to

meet what the defendant has told us they intend to put forth as defenses with respect to the two patents in suit in the way of invalidity.

THE COURT: Well, of course, that's true, too. If you intend to do this in rebuttal, that's all right, too. In the other patent cases I have had, it seemed to me that the -- I guess there's really only one where I have tried the issue of validity. The plaintiff just apparently felt that the expeditious way of doing it was to prove validity right along with infringement.

And let me say that, in referring to the large quantity of technological material that I have been favored with here, I do not mean to be critical in any way. I understand that all of this is necessary, and that I need to hear all of it, but I am also interested in honing in on those things which are really going to be decisive of the case.

MR. ANDERSON: Your Honor, I think we can approach it just the way that you have suggested, and we will proceed in that manner.

I will then direct our attention to the claims of the patent in suit, and we have, in the agreed statement of facts -- the plaintiffs have

rather specifically set out the games which are accused as infringement, starting at paragraph 28 of the agreed statement of facts, appearing at page 9 thereof --

THE COURT: Yes.

MR. ANDERSON: -- and we have indicated, and we did not obtain agreement from the defendants on this, and for that reason we have tried to prepare a little more extensively, perhaps, than otherwise would have been necessary. We suggested grouping games by what we thought were very logical groupings. The defendants elected not to reach a procedure of that kind.

So we have, in paragraph 28, indicated that all of the games accused, which are those listed in paragraphs 18, 20, 22, 24 and 26 of this agreed statement of facts, have been grouped by the plaintiffs into the five groups listed under paragraph 28, groups A through E.

Now, it turns out, too, the defendant Seeburg's game are all in groups A and B. The three games in Groups C, D and E, happen to be CDI games, and that, I think, also raises some questions.

But I think we will, in the course of

this presentation -- Dr. Ribbens has done rather extensive preparation on one game in Group A, namely, Paddle Ball, a game made by Seeburg, which I think the Court will find is -- well, maybe I better not characterize it at this time -- but it's a game that involves no fixed walls and no visible barriers, no bouncing off the walls. It's certainly more like the '507 patent and the original Pong game that's sitting over here in the courtroom.

The Group B set we have elected Pro Tennis, the second accused game in the group B category in paragraph 28. That also is a game manufactured by Seeburg. The circuit diagram is Plaintiff's Exhibit 91-B. Dr. Ribbens has done rather extensive preparation to explain that particular game to the Court and how it relates to the patent claims in suit.

We believe that all the rest of the games in Group B are substantially identical, some on a component to component basis. They have all been either made and sold, or sold by one of the defendants in the lawsuit. They are made by Seeburg, they are made by Chicago Dynamic Industries, they are actually made by some third party

manufacturers and sold by -- purchased and resold by Seeburg, or by World Wide Distributors, another defendant in the lawsuit.

THE COURT: Is there agreement by the defendant Seeburg, Mr. Goldenberg, that, for instance, in Group B the game Pro Tennis is typical of those games, so that an analysis of it would necessarily apply to all the other games?

MR. GOLDENBERG: I'm sorry, your Honor, there is not, and I would like the Court to understand that the games are described and understood by reference to very elaborate, very complicated electrical circuit drawings, that there was no practical way for us to go through those drawings with which we were not familiar and agree to the groupings proposed by Mr. Anderson. They were not games manufactured by Seeburg, in some cases they were games sold by Seeburg, or games sold by World Wide. World Wide, you have to understand, is nothing more than a distributor of these products. It has no in-house technical facility. In some cases it didn't even have circuit diagrams of the games that it had sold. And we see differences between these games in some cases. Mr. Anderson may not feel they are important. We do. We don't want to drag it out, and I would -- we will certainly listen carefully, but we think that there should b e some

showing made by Mr. Anderson with respect to something other than what he calls a typical game in a group. I don't know what we can do other than what we have done.

THE COURT: Well, it seems to me that the suggestion I made might well solve the problem, because Mr.Baer's testimony, as to the difference between the '507 and the '598 patents really had to do with function rather than describing components which brought about that function.

Now, I don't know whether it is the plaintiff's position here that their invention consists of a synergistic result from a combination of old elements, or whether there is a new element -- one or more new elements that comprise the invention in each of these patents.

But let's just assume, for purposes of illustration, that it's the plaintiff's contention that its invention consists in the primary flip-flop.

All right, we can go through each of these games and find out whether there's a primary flip-flop in there, and we won't have to go through the circuitry on each game to see whether it's the same or different in some other respects that

are not germane to the plaintiff's claim of infringement.

MR. ANDERSON: Your Honor, I don't believe there is any claim being asserted by plaintiffs here that reflects a primary flip-flop.

I might say that in order to make an invention, an inventor must complete something in physical terms, in components and parts that work to produce the result. Merely to dream of doing it isn't enough. You must either write it down and put it in a patent application that works, or actually build it and then file your patent application. Once he has built something that works and functions, then he is entitled to file his patent application and obtain a patent directed to the combination that he has invented, in terms -- according to 35 U.S.C. 112 -- in terms of a combination, and that combination can be described as a set of means for producing specific functions.

Now, each specific element might be old, and in the electronic art resistors and capacitors and transistors, of course, are all old.

But to put them together and produce a new result is the invention --

THE COURT: Let me ask this; since I am trying the case, I suppose I am entitled to have this information.

Is it the plaintiff's claim here that what you have by way of patentable material is a combination of old elements that produces a new result?

MR. ANDERSON: Your Honor, it is certainly our position that the patents in suit here create a completely new result. There just was no such thing as a TV game prior to Sanders' group putting together the necessary components to make a game that could be played on TV interactively, causing a player to intercept a ball or a puck or whatever you call it, a hit symbol, to cause it to change its direction, with horizontal and vertical sync, providing the information and the data in order to do that.

That we think is basic.

THE COURT: That fact, if it be a fact, could

have been established without any of this technical testimony. Someone could have gotten on the stand and in five minutes testified to the fact that prior to 1972 there were no TV games, that the people at Sanders got together and developed a number of circuits which resulted in the TV game, and here it is.

What have I learned here from listening to all of this technical information that has added to my understanding of the plaintiff's basic contention, if that basic contention is that be these things new or old, and we concede they are old, we have a new result that nobody ever had before?

MR. ANDERSON: Your Honor, I think, as is often true, there aren't blacks and whites, and I think the reason we have presented our story as we have is because of the very significant importance of the concept of using horizontal and vertical synchronization information and timing in combination with the circuits that generate spots based on time relative to those sync signals to create interactive games.

Now, we could have told the Court just that and rested, and perhaps we should have. But

we do anticipate the defendants' position, which is going to be, I presume, based on the art that they have cited under 35 U.S. 282, that something that didn't use horizontal and vertical sync signals to create this interactive game somehow render the games invalid. Either anticipation or obvious.

Now, we think that is an issue. Therefore, I believe it is important for the Court to recognize the significance of that inventor putting a moving ball on a screen just based on the time relationship between horizontal and vertical sync information and putting a player-manipulable spot on that same screen and inter-- secting it and causing the ball to change direction.

It is certainly our contention that that was fundamentally new with Sanders, and I believe that Mr Goldenberg is going to tell the Court that in 1950 or 1954 or 1960 somebody played a simulated pool game, for example, not interactively with the player hitting the ball, but nevertheless a ball moved on a screen, and it wasn't done with horizontal and vertical sync at all, that they used what is called a point plotter that

used a totally different principle, a principle of actually storing of addresses, not using time, as the basis for creating the game.

Now, I am arguing --

THE COURT: The storing of what?

MR. ANDERSON: Not using time to generate the display of the ball or whatever the hit symbol or the hitting symbol, the paddle, and to cause them to interact solely based on time relationship of signals in a rather ephemereal sense, which I think was not obvious --

THE COURT: As opposed to what in the other game?

MR. ANDERSON: In these computers there are several that Mr. Goldenberg indicated --

THE COURT: You used one word that I did not hear. Storing of --

MR. ANDERSON: Yes. I'm sorry. In a computer there is a location where you store an address or information about a particular point. You break down the TV -- excuse me. Not the TV screen. What he is going to say is a cathode ray tube. You break that down to display a point on the screen. But it is not done with a raster scan. In a computer, in a very complex, expensive piece of equipment, you say at point 20 down and 30 to

the left a ball is located, and it is stored in memory, and every once in a while the memory is called out and puts a spot right there. Then it blanks out, no sweeping, no synchronization, no timing involved, and then in the computer they have an equation of motion, a physical equation, in terms of X and Y and they process the data in the computer.

It is a way of demonstrating computers.

They then decide a few seconds later, a fraction of a second later, where the ball is, and the assign the ball a new address, and this is now still a pool ball, not an interactive game, but I think that is another weakness in the position. They now call out that new address, and they say that the ball has now moved, it is no longer at X20 Y15, that is is now moved down to X21 Y16, and they put the spot there with a cathode ray tube, not with a TV screen display. It costs several hundreds of thousands of dollars to build a piece of equipment like that. It certainly did in the 1950's and 1960's when they were trying to do it. It was not practical. It didn't simulate real time games, and we say it was totally different.

Now, I am arguing, and I think Mr. Goldenberg is entitled to equal time, but that is the reason we felt it was imporatnt that the Court understand the criticality of vertical and horizontal sync.

THE COURT: And I can follow that argument. But I am starting to feel some relief, because I sense that it is the plaintiffs' position that they have not devised a new circuit here, but rather that they have achieved a new result by a particular implementation of known technology.

MR. ANDERSON: Your Honor, the plaintiffs contend and submit that they did build a new circuit, but they are definitely not contending that their patents are limited to those circuits. They are the first ones that ever built a circuit, to the best of our knowledge, that could be used with a TV type display, with horizontal and vertical sweep and sync, to play interactive ball and paddle type games. Absolutely the first.

Now, having put that into real parts and real components and wired them together and demonstrated it, then we contend we were entitled to a patent, because they were the first ones that ever created that interactive ball and player action on a TV type display with horizontal and vertical sync. They are entitled to protection of that scope, and we submit the claims are of that scope, and that is where we were going after we got to the accused products, to actually look at individual elements of the claim, and there in terms of the claims say "Means for generating a hit spot."

Obviously, we have shown in the patents where they are. We will show in the accused products where they are. The means can be many different

circuits or circuit components or combinations. No circuit component that is either in the accused product or in the implementation that the inventors put together were, as components -- transistors or resistors or capacitors -- new. They all existed. They were put together in unique ways to generate what we submit is a unique result.

THE COURT: How far can you go with this "means" argument? I am not asking with reference to this particular case, but just for my own understanding.

Let's just assume that somebody invents a staircase in the claims that is described as a means of ascending and descending a multi-story building. The patent is issued, and the next year somebody comes out with -- well, Mr. Otis comes out with his elevator. Has he infringed that earlier patent? He certainly has a means for doing exactly what the patent claimed.

MR. ANDERSON: Yes, your Honor. If the staircase were the first means for getting from one floor to another and there was no way to get there, and Mr. Otis improved it, and this is fundamental -- I don't think Mr. Goldenberg will disagree --

MR. GOLDENBERG: I do disagree, your Honor.

MR. ANDERSON: If Mr. Otis improved on the basic staircase by making it move, he still conceptually, assuming that the first man's work was new in the first place, the fact that Otis took this man's stair and moved it did not necessarily mean that he was not using the first man's stair.

MR. GOLDENBERG: Your Honor, if I may, immediately to this point, that question was decided long ago by the Supreme Court of the United States in the telephone cases, something we are all familiar with, where Mr. Morse invented the telegraph and claimed it as a means of communicating intelligence by electric signals.

Years later he attempted to assert that kind of claim against the telephone, and the Supreme Court said no.

MR. ANDERSON: That was prior to 1952, you will agree, Mr. Goldenberg.

MR. GOLDENBERG: In 1952 Congress codified the patent laws, and it was precisely that, that there was a serious effort made, with the cooperation of the patent bar and industry, to ascertain the state of the patent laws as then construed by the United States Courts, and the effort of Congress at that time was

to codify, to express in the statutes, not only the previously existing statutory law, but the law as construed by the Courts.

So what Mr. Anderson has reference to and what I would call to the attention of the Court, as I did, you might recall, though I wouldn't expect you to remember after all of this --

THE COURT: I did read your pretrial memorandum, and I may have in mind what you are about to say.

MR. GOLDENBERG: In my opening statement, and this is 35 U.S.C., Section 112, in the third paragraph it says:

> "An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material or acts described in the specification and equivalents thereof."

So the mere fact that the claim has means for doing thus and so, and most of the claims we are dealing with in this lawsuit, that is the way they express whatever they have to say, "means for doing thus and so," that doesn't cover every conceivable way of doing that. It covers "those things described in the specification."

THE COURT: Of course, if it is limited to that, I don't see what it adds to the specification.

MR. GOLDENBERG: And equivalents thereof.

THE COURT: You wouldn't have to say "means". You could just say "equivalents". The doctrine of equivalents would obtain without the doctrine

of means.

MR. GOLDENBERG: Well, I think it is an enactment into the statute of the doctrine of equivalents at that time, so that the Court must deal with as it considers the question of infringement, and this is from our point of view, is what is the means disclosed in the specification to perform a certain function? What is the means used by the defendants to perform a certain function? And are those two means, whatever they may be, the equivalent of each other?

THE COURT: Except if the language "means as disclosed in the specification" is limited to the device shown by the specification and the drawings, then it seems to me that it is a redundancy to say "means" at all.

MR. ANDERSON: It is not so limited, your Honor.

THE COURT: You would say that the claims covered not only what they say in the claims but anything that is included in the specifications. That would be the way of saying that.

MR. GOLDENBERG: No, no. If "means" is used in the claim, then that claim shall be construed, that means shall be construed, to cover what is shown in the specification. As, for instance,

a flip-flop or some electrical circuit or device which is the equivalent of a flip-flop. It is going to cover those two things, if I may put it that way.

THE COURT: Is that language in Section 112 about means something that was added in 1952?

MR. GOLDENBERG: It was, your Honor.

MR. ANDERSON: It was written into the statute for the first time in 1952.

THE COURT: The doctrine of equivalence is considered the older, is it?

MR. ANDERSON: The doctrine of equivalence is older. There were two conflicting doctrines, I believe, as to function statements in patent claims, one along the line that Mr. Goldenberg has mentioned, which said that if you just try to state the end result of your total combination as a single function or a single means for performing a function, then you cannot expect to cover all means for performing that end function. If you had a single means that said "All means for playing games on TV," and that was the only means in a claim, I presume it probably would fail under the doctrine that Mr. Goldenberg is talking about.

The way the 1952 Act came up was because in a case, the Halliburton case in particular, the Court indicated that in view of that language, it was fatal if one of the elements of a combination was stated as a means plus a function, and to make certain that the Courts did not think that was a fatal defect, to have one of the elements of a combination recited in "means plus function", in a functional description, 112 includes this third paragraph that says that there is nothing wrong in a combination with stating a set of means, two or more means, plus the function of that means, and that is a perfectly proper way to define an invention.

Now, the cases and the statute, I think, make it absolutely clear that you are not to be limited to what you show in your drawings or in the patent description, because, and I think even the Supreme Court said this, that would be a travesty on the patent, because anybody could easily change one component and avoid infringement.

The patent is entitled to reasonable interpretation, and for that reason the Court said that when you recite "a means plus a function", you then look at the patent disclosure and decide what that means plus function was, and then you say any other means that produces that function in that combination satisfies the claim language.

THE COURT: What does that add to the already existing doctrine of equivalence.

MR. ANDERSON: It merely states that you are entitled in a claim to --

THE COURT: It has to do with patent language, then, rather than coverage of the language.

MR. ANDERSON: Yes. That's correct, your Honor. The doctrine of equivalence would have said, if our claim, as you suggest, recited a Flip-Flop, that then under the doctrine of equivalence Seeburg's use of

something other than a Flip-Flop, a ring counter, could still infringe under the doctrine of equivalence.

That is where the claim language was specific, a Flip-Flop or an oscillator or whatever.

That was very old law, as the Court suggests. But in addition to that, there was this question about whether you could in the claim be free of saying a Flip-Flop or an oscillator and say "means for generating a signal" or "means for reversing the direction of the ball" and have that construed --

THE COURT: It really goes to pleadings, if you consider a patent a pleading, it seems to me, more than substance.

MR. GOLDENBERG: Well, your Honor, I can't agree with that, because the provision in the statute or equivalents thereof takes the test of equivalency as it previously had existed in the law with respect to the doctrine of equivalence, which I think Mr. Anderson accurately stated, and now says that what the Court must do, and this I think does put the burden on the Court, is to determine whether the circuitry, the means for performing a certain function of the defendants' device, is equivalent of whatever means is shown in the patent in suit.

By that it must perform in substantially the same way --

THE COURT: Achieve substantially the same results substantially the same way.

MR. GOLDENBERG: That's right. So that equivalency test must be dealt with in this case in our view.

Do we have something akin to their time delay starting of a Flip-Flop or a sawtooth or whatever it may be? That kind of question is before the Court.

I don't know anything that Mr. Anderson and I might do beyond what we have done. I certainly would be willing to sit with him to shorten or to simplify the presentation in this respect. We have divergent views, of course.

THE COURT: Perhaps in that light I see your point, If I have to decide equivalence on each and every one of these accused devices, then obviously I will have to know whether they achieve the result in substantially the same way. If that is what I have to know, then I have to know how it does it.

MR. ANDERSON: Your Honor, Mr. Goldenberg introduced the subject by describing the work involved in analyzing the circuits. I think that is the burden of the defendant. It was the burden of the plaintiff.

I think we have tried to do it.

I trust if Mr. Goldenberg plans to try to meet our case, and he has always done it, and I think, if in fact there are real issues that are raised by differences between the sets in Group B, for example, where there are quite a few games, 14 games, I think we really could expedite things if Mr. Goldenberg would be willing to state what the difference is and why it is an issue on infringement.

THE COURT: I agree. I think that would shorten this thing considerably.

MR. GOLDENBERG: Your Honor, there are circuit diagrams that I have not even seen, and certainly did not study. There are certain games in Mr. Anderson's listing for which he does not have circuit diagrams.

MR. ANDERSON: There are two out of the 14 in that category, your Honor. One is Sportarama by United Games, and one is TV Hockey, by Amutronics.

THE COURT: How are they involved in these cases?

MR. ANDERSON: They are sold by World Wide or Seeburg or both. Sportarama is sold by both Seeburg and World Wide, I believe.

MR. GOLDENBERG: I simply don't know off the top of my head, your Honor.

THE COURT: Is Seeburg not a manufacturer?

MR. GOLDENBERG: Seeburg was a manufacturer, your Honor. It has not manufactured since 1973 or, perhaps, 1974, and at the same time it did, through some subsidiary distributing companies sell the games of other manufacturers.

Mr. Anderson is charging those games as well. World Wide is not a manufacturer. It simply is a distributor.

THE COURT: Well, I think our discussion has been helpful, if only to let me know that there doesn't seem to be a way to simplify this.

MR. ANDERSON: There may be, if we could prevail upon Mr. Goldenberg, even as to the two where he doesn't have schematic diagrams, -- let's put those in a separate category. We still have 12 games in Group B that we think raise identical issues as to infringement.

THE COURT: How are we going to finish this case by tomorrow afternoon if we have 12, at least 12 games to go?

MR. ANDERSON: Your Honor, I will candidly tell the Court how I intend to do that. We have detailed circuit diagrams marked of two games, of Paddle Ball and of Pro Tennis. This is a circuit diagram of the game Pro Tennis, which was made and sold by Seeburg.

This is a circuit diagram of Paddle Ball, made and sold by Seeburg.

Dr. Ribbens has analyzed the circuits, has circled in orange and purple and green and brown the elements of the claims, means for generating a hit symbol, means for generating a hitting symbd, means for detecting coincidence,

means for changing direction of the travel at the hit symbol, and we have marked those up on two games.

We intend to have Dr. Ribbens explain what analysis he did and how he concluded that each of these elements was present in each of the two games, Paddle Ball and Pro Tennis.

Paddle Ball we say is representative of Group A and Pro Tennis is representative of Group B.

THE COURT: Will Dr. Ribbens testify that he examined the other games?

MR. ANDERSON: And they raised the same issues and the same principles apply, and that will be it.

MR. GOLDENBERG: Your Honor, I may be stuck with that testimony if he is going to testify that, and if that is his conclusion. I may have to live with it.

THE COURT: Well, you see, under the Federal Rules of Evidence, an expert can simply state his conclusion --

MR. GOLDENBERG: I understand that.

THE COURT: Without giving any reasons at all.

MR. GOLDENBERG: It puts me to the test, your Honor.

THE COURT: And then the cross examiner takes off.

Well, that sounds like a sensible way to do it, because to be, again, candid, and there's no point in not being candid, I couldn't fool anybody, anyway, there's no possible way I could tell whether each of these 12 games is or is not similar to Paddle Ball and Pro Tennis. These schematics might differ in very marked respects that would be completely undetectable to me, so --

MR. GOLDENBERG: Our position is they do differ.

THE COURT: All right.

MR. ANDERSON: Well, the fact that they do differ to some degree, I don't think, should raise an issue.

THE COURT: Well, and that, of course, is what I was directing my question to initially. I don't want to get into immaterial differences.

MR. GOLDENBERG: My -- Mr. Anderson's position --

THE COURT: Or immaterial similarities.

MR. GOLDENBERG: Well, Mr.Anderson's comment with respect to my position on differences in infringement -- I have the same view about immaterial differences with respect to the patents in suit, your Honor.

THE COURT: Just one more question before we go ahead. Does the defendant contend that not only is there no essential difference between -507 and earlier work, but also that there is no essential difference between -507 and earlier work, but also that there is no essential difference between -507 and -598?

MR. GOLDENBERG: That's correct, your Honor.

THE COURT: All right.

MR. ANDERSON: Your Honor, with respect -- may I ask how the Court might like to proceed?

THE COURT: Go ahead and do it how best you conceive it in the light of our discussion here. I am content to let you try your own case in the way you feel would be most expositive.

MR. ANDERSON: You have suggested that perhaps Dr. Ribbens could or should state what he thinks is the inventive contribution of -507 and -598.

THE COURT: I would like to have his view on that.

BY MR. ANDERSON:

Q Dr. Ribbens, are you able to state what you think are the inventive contributions at least of the claims that we have taken claim elements out of, and state what you see as the inventive contributions of the two patents?

A Yes. I don't think I would do it as succinctly as a patent attorney, but I think I can do that.

MR. ANDERSON: All right. I might say, as a threshold on that, in the statement, the agreed statement of facts, we have included in paragraph 29 a detailed listing of the groups A through E that we have put various games in, and under each of the four vertical colums we have listed the claims of the original patents and the Reissue patents that we say are infringed by all of the games in each of the groups.

We have only used those games in preparing to present our case on infringement, and, of course, there are other claims directed to other features that are just not in issue here, so I think it should be accepted in that context, your Honor.

THE COURT: Right. That's helpful, as well. All right.

MR. ANDERSON: In addition, I think I might add one more introductory comment.

Now, there are quite a few claims listed on pages 10 and 11 of our agreed statement of facts, and different combinations applying to the four groups.

In presenting the case on infringement, and our case with respect to the accused products, we will not put in a complete exposition on each element of each of those claims, necessarily, but will specifically direct our attention to what we think are six -- seven representative claims, and present our case on the basis of those representative claims, but we will do it on an element-by-element basis, not on the wrapped-up combination, and I think the Court will find each element that we will have dealt with in those representative claims can be found in other claims, so that all claims, based upon our presentation, can be understood, hopefully, after our presentation.

MR. GOLDENBERG: Your Honor, this creates a problem for me, because I have to know the case I have to meet. Now, in earlier exchange between the parties, in response to interrogatories, far more claims were contended to be infringed than appear on pages 10 and 11 of the stipulation the Court has in front of it at this point.

Mr. Anderson has said, has conceded, that it is his burden to prove infringement.

Now, if I respond, my question -- and I think I am entitled to have an answer to it -- if he is going to rely on what he is now calling representative claims, and I respond to those claims, have I responded to his case? That's my question.

MR. ANDERSON: Your Honor, I think Mr. Goldenberg, respectfully, is inaccurate in saying that we asserted more claims in answers to interrogatories than in the pretrial agreed statement of facts, but I think he has had the agreed statement of facts, and we did sign it, and so I think that's really not an issue.

The question is only with respect to the claims that I have referred to in the agreed statement of facts. As to those claims that are in the agreed statement of facts that it says plaintiff is asserting, we will, in the course of the presentation, explain where each element of each of those claims is present in the accused games, and we will do that, for continuity, by going through six specific claims that include the various elements, and I think Mr. Goldenberg can decide whether or not or how he wishes to meet our case.

THE COURT: Well, it seems to me that the Court has to decide the case on the basis of the evidence I hear, and I am certainly not going to decide against the defendant on the basis of some claim about which I have not heard evidence.

Once I decide the case, however I decide it, it's res judicata. So, it seems to me that any further complaint against the defendant for any claim that could have been raised in this action is barred.

Does that answer your question?

MR. GOLDENBERG: Thank you, your Honor, that answers my question.

THE COURT: If I'm right on the law, it does; if I'm wrong, I think we have a problem. But that's certainly my understanding of the law.

MR. GOLDENBERG: Thank you, your Honor.

BY MR. ANDERSON:

Q All right, then, Dr. Ribbens, will you please state your understanding of what the inventive contribution that is in issue in this case with respect to the accused devices is in the '507 patent?

A Well, yes. I think '507 teaches the concept, first of all, of playing interactive games on a television

receiver.

In achieving that result, it generates signals which will cause symbols to appear on a television receiver in response and in relationship to horizontal and vertical synchronizing signals.

Without modifying a television receiver, the way in which we cause symbols to appear and control the position of those symbols on the screen is to generate signals in relationship to the synchronizing pulses, and I think '507 teaches that.

Q You used the term "Interactive". Exactly what do you mean in your definition of the inventinn?

A Well, I was trying to think of how to expand on that.

Q All right.

A Because I hadn't thought previously about stating this, and forgive me, your Honor, I probably won't state this as succinctly as someone who is skilled in patent law --

THE COURT: That's all right.

BY THE WITNESS:

A -- but with respect to the term "interactive", I am implying that there are symbols whose positions can be controlled by players, and I think we had evidence of that in this Exhibit 89, which was a reconstruction

of Figure 12A of '507, and in that figure the possibility of controlling the position of symbols on the screen of a television receiver was demonstrated by virtue of the generation of pulses whose position in relationship to the synchronizing pulse can be changed by virtue of controlling the time interval from the synchronizing pulse to the symbol.

The game is interactive because there is also a spot which moves under the influence of electrical signals in the package and which can also detect coincidence between the symbols under player control and this movable game spot, the conditions of the electronics being changed in response to that coincidence.

In that sense I believe it's interactive, because if one or more players -- typically two in the examples we have given, though it's certainly not fundamentally limited to two -- but the two players are playing one against the other to attempt to control the motion of the game spot in accordance with a set of rules for the game.

So I think the interactive play with television receivers is a component of the novelty of the invention. I think one of the important aspects is recognizing -- I think '507 does teach that it's possible

to use a television set to play games provided symbols can be generated in relationship to the synchronizing pulses. If we can supply the television receiver with synchronizing pulses and with separate signals which bear relationship to those synchronizing signals, and whose time delay relative to those synchronizing signals are under the control of a player, as in the case of the two spots of Exhibit 89, spot 1 and spot 2, or whose time occurrence relative to the synchronizing pulse is determined by electrical signals generated in the control package which we would use with the television receiver.

Q And in your view of the inventive contribution involved in the dispute here, what is the result of that interaction of what you call the player and the game control ball?

A You mean the electrical result or the functional result?

Q The functional result.

A Well, we can change the motion of the spot. It's very important that, as a result of this coincidence, that the game -- I thought I stated this, and I guess I didn't -- that as a result of the coincidence, the game electrical signals are changed so that this game spot or hit symbol, if you will, has

altered motion.

THE COURT: Doctor, inasmuch as there was never any TV game before, and I am assuming that to be the case, because that's the state of the evidence at the moment, isn't what you are saying really that everything about it is inventive, because there was never anything like this before?

THE WITNESS: Yes, that's very close to what I am trying to say.

THE COURT: Because you really haven't left anything out of your description of what you find to be inventive --

THE WITNESS: Yes.

THE COURT: -- in terms of the result that is accomplished.

THE WITNESS: Right.

BY MR. ANDERSON:

Q Dr. Ribbens, is it your understanding -- just to try to clarify that, your Honor -- that, in response to the interaction, there must be some change in direction --

A Yes.

Q -- or motion of the --

A Change in the motion.

MR. GOLDENBERG: Your Honor --

MR. ANDERSON: Well, he said that.

MR. GOLDENBERG: No, I'm sorry, but that was one of the most leading questions,certainly in one of the most critical areas, that we could possibly have.

MR. ANDERSON: I would be happy to have Dr. Ribbens expound on that.

MR. GOLDENBERG: No doubt that you would at this point and time.

THE COURT: Well, I don't rely that as prejudicial, because, frankly, I don't think that Dr. Ribbens would agree to anything that he doesn't think is the case. Whether he is right or not is another matter, but this witness does not impress me as a witness who can be led.

Go ahead, Mr. Anderson, do you have any-

thing further you want to ask on that?

MR. ANDERSON: Well, yes, your Honor. That is a statement of Dr. Ribbens' beliefs with respect to the inventive contribution in issue here as to the '507 patent.

BY MR. ANDERSON:

Q Now, Dr. Ribbens, can you make a similar statement with respect to your concept of what the inventive contribution was that's in issue in this lawsuit with respect to the '598 patent?

A Yes. In reading '598, I noticed that there were some new circuits which were introduced relative to the circuits -- the example circuits of '507, which were an improvement -- provided an improvement in the stability of the displayed spots, and, among other things, made possible the display of a fixed visible barrier, or the language of the patent is to call it a fixed hit symbol, in many cases, which would typically be a straight line.

The example circuits represented in '507 would have made that more difficult to achieve. The stability of the displayed image would have been poorer.

But the point is that it's possible, using the teachings of '598, to display a fixed visible barrier or a fixed hit symbol from which the ball can

bounce, which makes the playing of a game -- which changes the conditions under which the game can be played.

We now have an additional object which complicates the game play from the standpoint of the players, gives it more -- perhaps more realism, depending upon how the game is implemented, but makes possible, for example, a game such as is illustrated on the exhibit presently on the easel. I can't remember the number. I think it's 90.

Q Exhibit 90.

A Figure 12B. It makes possible the playing of a game such as handball which could not have been played using the teachings of '507, but is possible with respect to the teachings of '598, because we have generated a symbol which is called a wall generator, from which the ball can bounce, from which the motion of the ball can be altered.

THE COURT: Doctor, do you find in either of these patents any electronic component which is new to you?

THE WITNESS: Well, some of them are new to me. For example --

THE COURT: That's the wrong question, perhaps.

Do you find any of them that you consider

to be new to the art?

THE WITNESS: Well, I think --

MR. ANDERSON: Your Honor, may I just clarify the question?

THE COURT: All right.

MR. ANDERSON: You have used the term "component," which I think in the electrical art would mean the basic --

THE COURT: I mean any physical part --

MR. ANDERSON: Circuit combination or something?

THE COURT: Right.

THE WITNESS: And I interpreted it that way. A component in the system sense. That's the way I interpreted that statement.

I think, for example, in '598, the representation of the dot generators is rather clever, particularly with regard to '66 and '67 technology.

I think Mr. Baer asserted, and I agree wholeheartedly, that before that time the ability to generate this time delay pulse with a pair of transistors was not known, certainly was not known to me, and so that circuit is a contribution as well.

However, I feel the --

THE COURT: The dot generator circuit?

THE WITNESS: -- as taught by '598.

Mr. Baer, I think, has already testified that the use of a pair of transistors with that particular combination was new. Circuits that I would have chosen to use had I been given the task of designing such a symbol generator would have undoubtedly involved more than two transistors, probably four, I believe.

THE COURT: And yet that physical component doesn't relate to what you described as the new result, namely, the fixed hit symbol?

THE WITNESS: Well, it makes possible a very stable display using relatively inexpensive components. There are other means for achieving a fixed visible barrier. There were other means at Mr. Baer's disposal in those days, but they raised the cost considerably.

I think it's important to realize that we are talking about time intervals which are extremely short. It's 63 microseconds between the horizontal synchronizing pulses. And it's important to maintain the stability from one line to the next.

For example, in this fixed visible barrier of Exhibit 90, Figure 12B, there's a vertical wall drawn. Each line must create its contribution to that vertical line at the right instant of time.

If there were errors in time from line to line, the line would appear to wiggle, or might be indistinct, but would be distorted.

So, I think the stability is an important technical issue, the timing stability from line to line.

THE COURT: Well, of course, that it works well

and is well conceived doesn't necessarily make it novel.

THE WITNESS: No, I understand that. I'm just saying that the particular implementation using inexpensive components, a pair of transistors and some resistors and capacitors, was novel at the time, even though Mr. Baer has already testified they had alternate choices to make that visible barrier.

THE COURT: All right.

BY MR. ANDERSON:

Q Now, Dr. Ribbens, the Court asked a question earlier about whether you -- I can't precisely requote it -- but whether you thought, based on your statement, that the -507 patent -- and now I would broaden that to the -507 and -598 patents -- broadly covered all TV games.

Now, is it your belief, based on your analysis of everything involved here, that the two patents in suit broadly cover all TV games?

A All of those that I have studied.

Q All right -- well, all TV games that could be made, for example, not just the ones that you have looked at as accused devices, but --

A It seems to.

Q Well --

A In other words, they teach the possibility of playing interactive games on a television set in which symbols are under player control or under game control.

They teach the concept of detecting coincidence between a player control spot and the game spot, and altering the motion of the game spot.

Q Well, do you believe that these patents are broad enough to cover a game of chess on a -- played on a TV screen, for example, or a pumping game in which you just pump water up in a tube that's shown on the screen?

A Yes, I think so.

Q Well, where is the interaction in those games, then, a player and hit spot that causes the hit spot to change its motion?

A It depends on how it's implemented. I'm not sure I follow the question exactly. In other words, I could have a paddle that pushes water up, and the water would be used as the hit spot, and the paddle as the interacting spot, and that would cause a change in the motion. It's difficult to characterize all possible games by something such as this.

Q But you did state that you considered interaction and changing the motion of a spot to be a part of the basic invention of, as you view it, -507?

A I did state that, a part of the invention, yes.

Q And so if you could make a column of water move up by bouncing it, that could still be --

A That's one way in which it would be covered, would be taught by this patent, yes.

MR. ANDERSON: Your Honor, I had in mind to actually show to the Court, on a very rapid basis, the exhibits that relate to each of the games that are accused, and specifically with respect to each one, with a few exceptions, we have a circuit diagram, with respect to many we have a parts catalog or an operator's manual, with respect to most we have a photograph or picture of the actual accused game, usually with some sort of a display on the screen, and I thought that it might be helpful to hand these up and give the Court an idea of the context in which we are dealing with the question of infringement, and, if the Court will permit me to do that, I will hand up at this time as a group Plaintiffs' Exhibits 35-A, 35-B, C, D, and E, which are the circuit diagram, a Xerox copy of a brochure on the game TV Ping-Pong, a photograph of the game TV Ping-Pong, the parts catalog of Chicago Dynamics relating to the game TV Ping-Pong, and a parts list, and I will put on top

the photograph which is Plaintiffs' Exhibit 35-C.

THE COURT: Have you seen these, Mr. Goldenberg?

MR. GOLDENBERG: Yes, your Honor.

Your Honor, I am sorry, I don't know that I have seen all of them, particularly with respect to the --

THE COURT: Why don't you have a look at them.

MR. GOLDENBERG: -- Chicago Dynamics' matters. I'm sure there's no problem.

MR. ANDERSON: Perhaps we should give them all to -- they were all produced in depositions. None of them is new.

MR. GOLDENBERG: I understand that, sir, but I wasn't at all depositions, I did not get copies of all documents, and Mr. Threedy was, of course, in the case representing his own client and looking at the exhibits at that time.

MR. ANDERSON: I think you attended all of those depositions, Mr. Goldenberg.

MR. GOLDENBERG: I may have, but I don't know that I looked at Mr. Threedy's documents. This won't take very long.

MR. ANDERSON: All right, I would like to hand the Court Plaintiff's Exhibits 37-A and 37-B, which are, respectively, a circuit diagram and a colored brochure on Chicago Dynamic Industries' game Olympic TV Hockey, which is in the Class B of the plaintiff's classification of games.

And I will hand up to the Court two documents relating to the defendant Chicago Dynamic Industries' game TV Goalie, and they are Plain-

tiff's Exhibits 38-A, a circuit diagram, and 38-B, a color brochure showing the game with a simulated display on the screen.

THE COURT: Incidentally, has anything further been heard of from Chicago Dynamics?

MR. ANDERSON: I received in the mail I believe this morning -- at least I saw it this morning -- a notice that Mr. Threedy sent to Mr. Goldenberg and to me and to the attorneys for the bank and directly to Chicago Dynamic Industries.

MR. GOLDENBERG: I got a copy of that yesterday, your Honor, and that's all that I have seen or heard.

MR. ANDERSON: I would like to hand up to the Court two documents relating to Chicago Dynamics' accused game TV Pin Game, which comprise a set of schematic diagrams stapled together, as Plaintiff's Exhibit 39-A, and a color brochure on TV Pin Game for one or two players, identified as Plaintiff's Exhibit 39-B. In each case I am putting the colored brochure on the top, your Honor.

THE COURT: With good reason. That's the one I can best understand.

MR. ANDERSON: We do submit that the colored brochures are, even to us, extremely helpful in

understanding how the game is played and whether or not there are or are not hit and hitting spots, which, as I think the Court will see, is an important part of the claims, and how we will apply them later.

THE COURT: Someone gave my six year old son a TV game for Christmas. I don't even know what brand it is. I don't think it's any of the brands that are involved in this case. I'm hoping at the conclusion of this case I will know how to hook it up!

MR. ANDERSON: Now I would like to hand up to the Court a set of circuit diagrams and a colored brochure on Chicago Coin's game entitled, or identified, as Super Flipper. The circuit diagrams are Plaintiff's Exhibit 40-A and the colored brochure is Plaintiff's Exhibit 40-B.

THE COURT: That's quite an elaborate one, that Super Flipper.

MR. ANDERSON: It is an attempt, your Honor, to simulate something of the nature of a pinball game.

THE COURT: Yes.

MR. ANDERSON: With respect to the Seeburg game Paddle Ball, one of the two which we will

be going into in some detail, we would like to hand up to the Court documents relating to that game, namely, Exhibit 41-A, which is the complete circuit diagram, Exhibit 41-B, a colored brochure, Exhibit 41-C, longhand notes relating to a Zenith TV modification for Paddle Ball, and Plaintiff's Exhibit 41-D, the circuit diagram of a Zenith television receiver which is employed in the -- included in the game Paddle Ball.

With respect to the accused game Pro Hockey, which was made and sold by Seeburg, we have three documents. Exhibit 42-A is the complete circuit diagram of the game, Exhibit 42-B a colored brochure of the game, with a simulated hockey display on the screen, showing players and a puck, and Exhibit 42-C, which is a Pro Hockey wiring diagram for the entire game, including the circuit and the various auxiliaries.

THE COURT: Do the Odyssey games, or any of them, have a sound component to simulate the bounce or signal the bounce?

MR. ANDERSON: Yes, your Honor. Today I think probably all of the games on the market have sound. The patents, I think, discuss sound. And the original Odyssey ITL 200 did not have sound.

MR. GOLDENBERG: Isn't that true also of the 200 and the 300, or am I incorrect?

MR. ANDERSON: No, I think you are incorrect on that.

MR. GOLDENBERG: How about the 100, did it have sound?

MR. ANDERSON: I don't know.

MR. WILLIAMS: Yes, it does.

MR. ANDERSON: It does.

MR. GOLDENBERG: So the only one that did not was the 1TL 200, is that correct?

MR. ANDERSON: That is my understanding, and Mr. Williams is nodding that that's his understanding.

MR. GOLDENBERG: Okay.

THE COURT: But sound is not involved in the claim of infringement, I take it?

MR. ANDERSON: Sound is not involved in the claim of infringement.

MR. GOLDENBERG: No.

MR. ANDERSON: I think Mr. Goldenberg agrees.

Your Honor, with respect to the accused game of Seeburg called Pro Tennis, we have four documentary exhibits with respect to that accused game. That is the game which we will use as the example, or typical game,in Class B, including the fixed visible lines that show in the brochure, Exhibit 43-B, across the top and bottom.

The documentary exhibits are Exhibits 43-A, a complete circuit diagram, Exhibit 43-B, a colored brochure, Exhibit 43-C, which is the overall diagram of the hooking up of the TV receiver to the rest of the components, Exhibit 43-D is a catalog of parts, and we also have,

with respect to Pro Tennis, the actual game Pro Tennis, which is Plaintiff's Exhibit 43-E, and it contains the Zenith receiver, television receiver, that is referred to.

Your Honor, with respect to another game called Olympic Tennis, the game is shown in a circuit diagram which we have here as Massey Deposition Exhibit 16, which is now Plaintiff's Exhibit Number 44-A.

I might say most of these documents were also deposition exhibits, but I haven't mentioned that before.

The colored brochure on Olympic Tennis is Plaintiff's Exhibit 44-B. It shows on its face a source called "See-Fun". It is my understanding that that is a product of the Seeburg Corporation, or one of its subsidiaries.

MR. GOLDENBERG: That's correct, your Honor. The game -- was it actually made by Seeburg?

MR. RIFKIN: No.

MR. GOLDENBERG: It was sold by Seeburg, your Honor.

MR. ANDERSON: And I will hand those up on the game Olympic Tennis.

THE COURT: Not that it makes any difference,

but to whom would Seeburg sell a game of this kind? Would it be, say, to a tavern owner, who would then own the machine, or would he sell it to someone who would then place the machine in taverns?

MR. GOLDENBERG: Your Honor, typically they would be sold to distributors.

THE COURT: I see.

MR. GOLDENBERG: My understanding is that the distributor may sell to the tavern owner or to the arcade owner.

On the other hand, the machine may go into the tavern or into the arcade with the proceeds to be shared between the distributor and whoever was operating the games.

MR. ANDERSON: The next accused game is a game called Tennis Tourney. It is manufactured by Allied Leisure of Hialeah, California. It is purchased by and then resold by both Seeburg and the defendant World Wide Distributors. It is shown in the color brochure, Plaintiffs' Exhibit 45-B, and the circuit diagrams of Plaintiffs' Exhibit 45A.

This game also is in Class B, and it has fixed visible walls across the top and the bottom of the screen.

The next game that is accused is a game called Volley. We do not have a color brochure on the game Volley. It is manufactured by a company named Ramtek. It is sold both by Seeburg and by

the defendant World Wide Distributors. It is shown in Plaintiffs' Exhibits 47-A and 47-B.

MR. GOLDENBERG: Your Honor, if I may just interrupt, the last exhibit you just received, that Allied Leisure game, I think highlights the problem that I have had in connection with this agreeing to this classification by Mr. Anderson.

He said, as he presented it to you, that it showed boundaries or limits which were displayed.

I studied that diagram for several hours, and I couldn't tell whether they were displayed or not. I am not an expert. I will do the best I can with what I bring to these matters.

With respect to the -598 patent, perhaps you would have in mind whether or not a boundary is displayed or a fixed hit symbol is displayed is an issue, so I mention this just so that the Court might appreciate the position I am in with respect to that kind of situation.

Maybe it is displayed, maybe it isn't. The only way I could have found that out, and I don't think I was obligated to do this, was to retain an expert at some expense to the client and study for some long period of time a drawing. I think I

properly felt this was Mr. Anderson's burden in this case.

THE COURT: May I ask this question, and it is apropos of no matter that is immediately before me.

Does the -598 patent give the plaintiff any protection in addition to that which it enjoys by virtue of the -507 patent, in your view?

MR. ANDERSON: The two patents do not have the same metes and bounds. It is somewhat in the nature of the improvement that I discussed earlier with the Court in our discussion of combinations.

THE COURT: Could anyone come out with a fixed hitting symbol game and claim that it didn't violate -507, just because it contained a fixed hitting symbol? Would that be your fear?

MR. ANDERSON: I think certainly the converse is definitely true, as I think perhaps in the Court's question it recognizes. One could infringe -507 and not have fixed visible hit symbols and therefore not infringe -598. -598 is the addition of the fixed hit symbols. I would have to actually look at the claim-by-claim analysis. I think certainly there are claims in -598 that could be infringed where the same circuit would not infringe a claim of -507.

I know that to be a fact, but I am not certain that any of those claims that are in that category are being asserted now in this case.

Mr. Williams tells me that none of those is. Probably all of the claims that are being asserted now would be infringed by the -507 if they are infringed by the -598.

THE COURT: It just seems to me that if the patentable entity here is a TV game involving interacting symbols which change direction upon coincidence, I don't see what -598 adds to -507. I am just thinking out loud. I realize that is one of the issues before me. But it points up what you are going to have to explain to me, I think.

MR. ANDERSON: That is one of the points that Dr. Ribbens addressed himself to.

THE COURT: I see that there is a new component in this thing and, of course, I haven't looked at the claims of '507. Maybe the claims of '507 are not broad enough to include the fixed hitting symbol. But certainly the concept of '507 as expressed by both Mr. Baer and Mr. Ribbens seemed to me to be inclusive of any TV games that involves what we have been referring to here as "bouncing".

MR. ANDERSON: Your Honor, I think, as I understand it, the '507 circuit had this problem, that it had a certain fuzziness and drift that prevented its use for generating any fixed symbols, and that was not done, any fixed visible symbols.

I think the Court is correct in that '507 has claims to interaction --

THE COURT: Of course interaction of a fixed symbol is not a trick, is it?

MR. ANDERSON: In addition to the rest of it, yes. '507, as the Court has correctly observed, the interaction, the synchronized TV type display of hit and hitting symbols, whether hitting symbols

are player controlled and the hit symbol is game and player controlled, as we view it in the general sense, and the '598 patent includes means for accomplishing all those things, different means, but means for accomplishing all of those things that are taught in the '507 patent, and it further teaches the novel idea of building walls off of which you can bounce the balls in addition to having player manipulated symbols.

THE COURT: All right.

MR. ANDERSON: I will hand the circuit diagrams of Ramtek's game Volley, Exhibits 47-A and 47-B. There is no colored brochure with respect to the game Volley.

I also will hand up to the Court a brochure illustrating Ramtek Corporation's game Soccer, which is Plaintiff's Exhibit 49-D, and the circuit diagram for that game Soccer, Plaintiff's Exhibit 49-A and 49-B and 49-C.

Soccer, made by Ramtek, has been sold by World Wide Distributing Corporation, one of the defendants in this lawsuit.

I might say there are red markings setting forth the different what I would call blocks of the circuit diagram, such blocks as ball generator

and video output. Those were placed on the circuit diagrams during depositions in the course of pretrial in this case.

MR. GOLDENBERG: Arethose depositions going to be offered, Mr. Anderson?

MR. ANDERSON: I think we have a stipulation that precludes the need for those. We have stipulated that the literature accurately describes or illustrates the games.

MR. GOLDENBERG: I understand that, and I have no problem with that. It is the red marks on the exhibits. If you want to put in exhibits without red marks on them, I have no problem.

MR. ANDERSON: Well, maybe to the extent that they are red marks, we will put in the depositions, too. They might possibly be helpful, in that they do break the circuit diagram into blocks.

If you would like it, we will do it. We don't think it is necessary.

MR. GOLDENBERG: We will wait and see what happens with Dr. Ribbens' testimony.

THE COURT: If you are worried about the trier of fact being swayed by the red marks, I think your fear is groundless, Mr. Goldenberg.

MR. GOLDENBERG: I don't have any problem with

that, your Honor, but to the extent that Mr. Anderson would make certain contentions about what they show or by what means they are intended to cover, I would have a problem.

THE COURT: I will simply ignore the red marks on those exhibits.

MR. ANDERSON: Thank you, your Honor.

The plaintiffs submit various documents with respect to Ramtek Corporation's game called Hockey, and by an agreed statement of fact, the Hockey has been sold both by the defendant World Wide and the defendant Seeburg.

The documents are a descriptive brochure and a picture and a simulated display of a hockey game, Plaintiff's Exhibit 48-C, and a circuit diagram, Exhibits 48-A and 48-B.

THE COURT: It says right here on the first page, "Here is a totally different video game."

MR. ANDERSON: I am afraid they all say that, your Honor.

THE COURT: It looks like you are stuck there, Mr. Anderson.

MR. ANDERSON: That is what they say about my Chevrolet also.

THE COURT: Res ipsa loquitor.

MR. ANDERSON: The next accused game, your Honor, is called Space Ball. It is a product of Nutting Associates and has been sold by the defendant World Wide

The exhibits are a brochure, Plaintiff's Exhibit 50-B, and a circuit diagram, Plaintiff's Exhibit 50-A.

This also has some red markings on it, but a very relatively limited number.

THE COURT: I will ignore all red markings on all exhibits.

MR. ANDERSON: They were also done during a Nutting deposition.

The next game, your Honor, is a game called Sportarama. It is manufactured by United Games, Inc. It is sold by both World Wide and Seeburg.

The brochure that we are putting into evidence, Plaintiffs' Exhibit 51, is a document from the defendants, and we only have a Xerox copy.

If possible, I would like to actually have before the Court the original.

The same is true, Mr. Goldenberg, with respect to TV Hockey, Plaintiffs' Exhibit 52, and the brochure on Wham Bam. Wham Bam is by PMC Corporation, Exhibit 53.

MR. GOLDENBERG: Mr. Anderson, we don't have copies or originals of those in Court. We will check our office, and with the Court's permission, we will find the same substitute for the Xerox that Mr. Anderson has.

MR. ANDERSON: I will hand up the brochure, the Xerox we have, on Sportarama of United Games, Plaintiffs' Exhibit 51.

We have stipulations 79 and 80 with respect to certain operations of these games, where we do not have an actual circuit diagram.

I might state that we sought circuit diagrams from the defendants, and the defendants were unable to provide them.

MR. GOLDENBERG: The defendants did not have any, your Honor.

MR. ANDERSON: I will hand up to the Court Plaintiffs' Exhibit 52, relating to the game TV Hockey, a game manufactured by Amutronics, Inc. The game TV Hockey has been sold by the defendant Seeburg.

THE COURT: I haven't seen anything yet that looks like one of these automobile driving games that they have in arcades.

Was there one here?

MR. ANDERSON: No, your Honor. There are no automobile driving games accused in this action.

I might state that there were prior to some dispositions of some other defendants.

THE COURT: I see.

MR. ANDERSON: I will hand up to the Court Plaintiffs' Exhibit 53, a descriptive brochure on the game Wham Bam, made by PMC Electronics Co., Inc.,

of Philadelphia, and Wham Bam has been sold by defendant Seeburg.

As I mentioned, the latter three are all the subject matter of stipulations set forth in the agreed statement of facts, paragraphs 79 and 80.

Paragraphs 79 and 80 include other games, but also include those three.

The next accused game is a game called Astro Hockey. It is manufactured by Brunswick Corporation of Skokie, Illinois. It is sold by the defendant World Wide.

We have two brochures in several colors, Plaintiffs' Exhibits 54-B and 54-C, and a circuit diagram of the Astro Hockey game, Plaintiffs' Exhibit 54-A.

This game is also in Group B of the Plaintiffs' classifications.

THE COURT: Is this the same Brunswick that makes the bowling --

MR. ANDERSON: Yes, your Honor, I believe that it is the same corporation.

THE COURT: Just as an incidental matter, and maybe it's none of my business, but why aren't they a defendant in this lawsuit?

MR. ANDERSON: I think that their game arose much -- you know, perhaps later, after the complaint was filed. I don't know the answer to that.

THE COURT: I see.

MR. ANDERSON: I think we learned of the game in the course of discovery in the lawsuit, and it's also my understanding that there are very few of those games actually involved as between these parties.

Do you know about that, Mr. Goldenberg?

MR. GOLDENBERG: Mr. Anderson, I don't know the precise number, but I think very few is probably correct.

THE COURT: Whenever I see a name like that, a good solvent defendant, my curiosity is aroused.

MR. ANDERSON: I think -- I believe that we learned of it -- of that particular game in the

course of discovery in this lawsuit. We weren't aware that they were marketing it at the time.

MR. GOLDENBERG: If it weren't for the honor, your Honor, we would rather not be here!

MR. ANDERSON: Your Honor, at this point we have just about ten or nine minutes left of the day, and I would suggest perhaps this would be a logical breaking point, rather than to begin Dr. Ribbens' discussion of the accused games.

THE COURT: All right, then, we will recess until 10:00 o'clock tomorrow morning.

Now, you can leave all your things here if you like. I do have my motion call this afternoon, but it's been pared down considerably. I no longer have that same mob scene I used to have on Wednesday afternoons.

MR. ANDERSON: We will lay them aside here.

THE COURT: I think they will be safe here.

MR. ANDERSON: Thank you, your Honor.

THE COURT: All right.

(Whereupon the trial of the above-entitled cause was adjourned to Thursday, December 30, 1976 at 10:00 a.m.)

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